

1 1. A method for performing time slot switching of synchronous data across an
2 asynchronous medium comprising:

3 (a) converting synchronous serial data related to a source time slot into
4 synchronous parallel data units in accordance with a synchronous clock signal;

5 (b) formatting the synchronous parallel data units into a first subpacket in
6 accordance with the synchronous clock signal, the first subpacket generated during a
7 first synchronization interval of the synchronous clock signal;

8 (c) generating a packet from a plurality of subpackets, including the first
9 subpacket;

10 (d) asynchronously transmitting the packet across an asynchronous medium;
11 and

12 (e) extracting the subpackets from the packet and storing the subpackets in a
13 plurality of buffers, each of the buffers associated with a destination time slot,

14 the arrangement of subpackets within the buffers being determined by the first
15 synchronization interval during which the subpacket was generated plus a fixed delay
16 offset.

1 2. An apparatus for performing time slot switching of synchronous data across an
2 asynchronous medium comprising:

3 (a) serial to parallel interface for converting synchronous serial data related to
4 a source time slot into synchronous parallel data units in accordance with a
5 synchronous clock signal;

6 (b) logic for formatting the synchronous parallel data units into a first
7 subpacket in accordance with the synchronous clock signal, the first subpacket
8 generated during a first synchronization interval of the synchronous clock signal;

9 (c) logic for generating a packet from a plurality of subpackets, including the
10 first subpacket;

11 (d) logic for asynchronously transmitting the packet across an asynchronous
12 medium;

13 (e) logic for extracting the subpackets from the packet and for storing the
14 subpackets into a plurality of buffers, each of the buffers associated with a destination
15 time slot,

16 the arrangement of subpackets within the buffers being determined by a value
17 representing the first synchronization interval plus a fixed delay offset.

1 3. A method for transferring data comprising:

2 (a) packetizing a plurality of synchronous serial data streams into respective
3 subpackets during a first synchronization interval, each subpacket associated with a
4 source time slot;

5 (b) asynchronously transmitting the subpackets through an asynchronous
6 medium; and

7 (c) reconverting the subpackets into synchronous data streams during a
8 second synchronization interval having a fixed delay offset relation to the first
9 synchronization interval.

1 4. The method of claim 3 wherein (a) comprises:

2 (a1) converting the synchronous serial data streams into synchronous parallel
3 data units.

1 5. The method of claim 4 wherein (a) comprises:

2 (a2) formatting the synchronous parallel data units into a subpackets during a
3 first synchronization interval.

1 6. The method of claim 5 wherein (b) comprises:

2 (b1) generating a packet from a plurality of subpackets,

3 the packet including data identifying the first synchronization interval during
4 which the subpackets were formatted from the synchronous parallel data units, and a
5 destination time slot identifier associated with each subpacket.

1 7. The method of claim 6 wherein (b) comprises:
2 (b2) asynchronously transmitting the subpackets through an asynchronous
3 medium as part of the packet.

1 8. The method of claim 3 wherein (c) comprises:
2 (c1) extracting the subpackets from the packet, and
3 (c2) storing the subpackets into a plurality of buffers, each of the buffers
4 associated with a destination time slot, the arrangement of subpackets within the buffers
5 being determined by a value representing the first synchronization interval plus a fixed
6 delay offset.

1 9. The method of claim 8 wherein (c) comprises:
2 (c3) reading the subpackets from the buffers as a plurality of parallel data
3 units; and
4 (c4) converting the parallel data units into synchronous serial data streams.

1 10. A apparatus for transferring data comprising:
2 (a) a source of synchronization signals defining a plurality synchronization
3 intervals;
4 (b) an interface for packetizing a plurality of synchronous data streams into
5 respective subpackets during a first synchronization interval, each subpacket
6 associated with a source time slot;
7 (c) a mechanism for asynchronously transmitting the subpackets through an
8 asynchronous medium; and

9 (d) an interface for reformatting the subpackets into synchronous data
10 streams during a second synchronization interval having a fixed delay offset relation to
11 the first synchronization interval.

1 11. The apparatus of claim 10 wherein (b) comprises:
2 (b1) logic for converting the synchronous serial data streams into synchronous
3 parallel data units.

1 12. The apparatus claim 11 wherein (b) comprises:
2 (b2) logic for formatting the synchronous parallel data units into a subpackets
3 during a first synchronization interval.

1 13. The apparatus of claim 12 wherein (b) comprises:
2 (b3) logic for generating a packet from a plurality of subpackets,
3 the packet including data identifying the first synchronization interval during
4 which the subpackets were formatted from the synchronous parallel data units, and a
5 destination time slot identifier associated with each subpacket.

1 14. The apparatus of claim 13 wherein (c) comprises an asynchronous switch.

1 15. The apparatus of claim 10 wherein (d) comprises:
2 (d1) logic for extracting the subpackets from the packet, and
3 (d2) logic for storing the subpackets into a plurality of buffers, each of the
4 buffers associated with a destination time slot, the arrangement of subpackets within the
5 buffers being determined by a value representing the first synchronization interval plus a
6 fixed delay offset.

1 16. The apparatus of claim 15 wherein (d) comprises:

2 (d3) logic for reading the subpackets from the buffers as a plurality of parallel
3 data units; and

4 (d4) logic for converting the parallel data units into synchronous serial data
5 streams.

1 17. An apparatus comprising:

2 (a) an asynchronous switch;

3 (b) a plurality of circuit server modules coupled to the asynchronous switch,
4 the server modules comprising:

5 (i) a time division multiplex interface; and

6 (ii) data adaptation logic; and

7 (c) a source of synchronous clock signals coupled to each of the circuit server
8 modules, the synchronous clock signals defining a plurality of synchronization intervals;
9 the circuit server modules configured to perform synchronous time slot switching
10 of synchronous data across the asynchronous switch.

1 18. The apparatus of claim 17 wherein the time division multiplex interface
2 comprises:

3 serial to parallel conversion logic for converting synchronous serial data streams
4 into parallel data units.

1 19. The apparatus of claim 17 further comprising:

2 parallel-to-serial conversion logic for converting a plurality of parallel data units
3 into synchronous serial data streams.

1 20. The apparatus of claim 18 wherein the data adaptation layer comprises:

2 an ingress data memory coupled to the time division multiplexed interface;

3 an ingress context memory; and

4 subpacket construction logic for constructing in the ingress data memory a
5 plurality of subpackets during one of the synchronization intervals, each subpacket
6 associated with a source time slot and containing parallel data derived from a
7 synchronous serial data stream received through the time division multiplexed interface
8 subpacket.

1 21. The apparatus of claim 20 wherein the ingress context memory stores context
2 data associated with a subpacket, the context data comprising a destination time slot
3 identifier and a queue identifier associated with a subpacket.

1 22. The apparatus of claim 21 wherein the data adaptation layer comprises:
2 an ingress queue coupled to the asynchronous switch; and
3 packet construction logic for constructing in the ingress queue a packet including
4 a plurality of subpackets and the respective context data associated with each
5 subpacket.

1 23. The apparatus of claim 22 wherein the packet further comprises data identifying
2 the synchronization interval during which the subpackets contained therein were
3 constructed.

1 24. The apparatus of claim 17 wherein the data adaptation layer further comprises:
2 an egress data memory having a plurality of playout buffers associated with a
3 plurality of destination time slots; and
4 depacketizing logic for receiving a packet form the asynchronous switch and for
5 storing subpackets contained therein into the plurality of playout buffers in the egress
6 data memory.

1 25. The apparatus of claim 24 wherein the data adaptation layer further comprises:

2 playout logic for synchronously supplying parallel data from the playout buffers to
3 the time division multiplexed interface.

1 26. A memory for storing data to be processed by a data processing system
2 including an asynchronous switch, the memory comprising:

3 a data structure stored in the memory and usable to perform time slot switching
4 of data, the data structure comprising:

5 a plurality of subpackets, each subpacket associated with a source time
6 slot and containing parallel data derived from a synchronous serial data stream, each
7 subpacket constructed during a common synchronization interval;

8 a synchronization tag identifying the common synchronization interval
9 during which the plurality of subpackets were constructed;

10 data identifying the number of subpackets contained within the data
11 structure; and

12 context data associated with each one of the plurality of subpackets, the
13 context data including a destination time slot identifier corresponding to the source time
14 slot associated with a subpacket.